

DF 4: PV V - Ramamoorthy Ramesh

Time: Monday 14:00–14:45

Location: HSZ 01

Plenary Talk

DF 4.1 Mon 14:00 HSZ 01

Electric Field Control of Magnetism — •RAMAMOORTHY RAMESH — University of California, Berkeley

Complex perovskite oxides exhibit a rich spectrum of functional responses, including magnetism, ferroelectricity, highly correlated electron behavior, superconductivity, etc. The basic materials physics of such materials provide the ideal playground for interdisciplinary scientific exploration. Over the past decade we have been exploring the science of such materials (for example, colossal magnetoresistance, ferroelectricity, etc) in thin film form by creating epitaxial heterostruc-

tures and nanostructures. Among the large number of materials systems, there exists a small set of materials which exhibit multiple order parameters; these are known as multiferroics. Using our work in the field of ferroelectric (FE) and ferromagnetic oxides as the background, we are now exploring such materials, as epitaxial thin films as well as nanostructures. We have been able to demonstrate electric field control of both antiferromagnetism and ferromagnetism at room temperature. Current work is focused on ultralow energy (~ 1 attoJoule/operation) electric field manipulation of magnetism. We are also exploring artificially designed multiferroics. In this talk, I will describe our progress to date on this exciting possibility.